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EXAMPLES OF AMERICAN CUT GLASS

AMERICAN CUT GLASS UNRIVALED

No line of products offers more conclusive proof of the superiority of American art manufactures than cut glass. Less than a decade ago American glassware was looked upon with suspicion, damned with faint praise, or even openly condemned as being of poor texture and inartistic design. To-day the glass-workers of the United States make the proud boast that their product, both in texture and design, is unequaled, and the European manufacturers, who formerly supplied the American market, are forced reluctantly to confess that the boast of their New World rivals is founded on fact, and not on presumption.

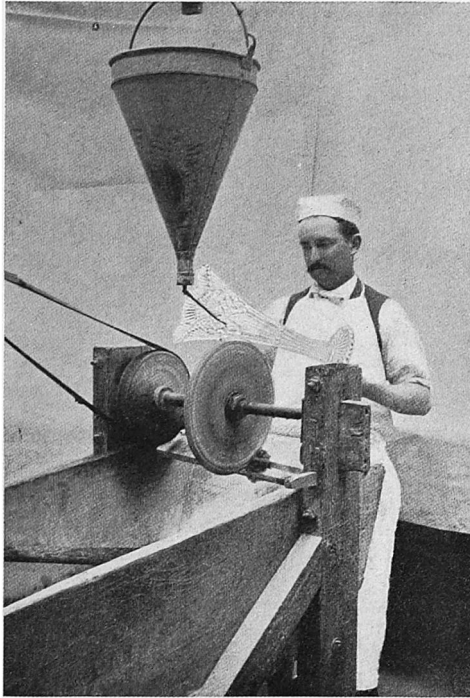
There are at the present time in this country over sixty-manufacturers of cut glass, scattered from the Mississippi to the Atlantic coast, but located for the most part in southern Massachusetts, southern New York, and northeastern Pennsylvania, who are daily turning out ware with which the imported goods brought from Europe bear no comparison.

The development of the cut-glass industry in America is similar to the development of artistic pottery. Naturally the industry had to

pass through its infantile stages, and a rather discouraging infancy and childhood it had. There was no dearth of artistic talent on the part of our designers, no lack of material suitable for the finest work, no want of cleverness and enterprise among native glass-workers. But the purchasing public was prejudiced against home product, and just

as in the case of artistic pottery, it was said, tacitly or openly, that nothing good came from America.

The popular demand was for imported glassware, and nothing but imported, or what purported to be imported, goods would satisfy the purchasers. Long before American manufacturers obtained public recognition their product was practically as good as it is to-day, but it was shelved in deference to this senseless prejudice; and it was not until 1893, when home-made goods were placed in sharp comparison with European products, that the American public saw the intrinsic beauty and worth of the output of our factories, and realized the inanity of its former practice of priz-



A ROUGHER AT WORK

ing only that which was imported, or said to have been imported.

The turning-point having been passed, the development of cut glass in the United States has been quite unprecedented. Our manufacturers have realized the opportunity opened to them, and with the conviction that this country could supply artistic products as well as raw material, they have been strenuous in maintaining the rank which persistence and merit finally won for them. They have evolved their own styles and have educated their own workmen, keeping ever before them the work of their European competitors. They have the satisfaction to-day of knowing that their efforts are fully appreciated.

It is not the purpose of this article to extol or to compare the products of different native manufacturers. Indeed, there is little that is distinctive about cut glass that lends itself to exhaustive treatment outside of technical books. Purity of texture, grace of design, and



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skillfulness of workmanship are the three factors in popular estimations that enter into the beauty of those iridescent pieces over which lovers of the beautiful grow enthusiastic. A few facts about the methods and difficulties of the factory, however, will be of interest in connection with this notice of American superiority.

The workman has not the scope and latitude enjoyed by the potter. He is denied the privilege of color, for instance, and of many another pleasing decorative effect. He simply takes the purest and

intrinsically least decorative material and shapes from it a thing of beauty. Hence, material apart, grace of design and skill in manipulative treatment are the two things upon which he must rely.

It is surprising how little is known even by the most enthusiastic admirers of cut glassware of the processes through which a piece must go. The art of glass-making dates back at least to the days of Egypt, Assyria, and Phœnicia, and the process of glass-making is to-day practically the same as it was thousands of years ago.

We in modern times have attained exceptional successes in the art, as regards material, only by excessive care in the selection of ingredients and in skill in manipulation.

Glass-cutting, however, is a different matter, and deep cutting as practiced to-day dates only to the early part of the nineteenth century, and is really an art incident to the invention of the steam-engine. Great as was the reputation acquired by the Venetians as glass-workers, there is no evidence to show that they were glass-cutters, and the Roman glass-cutting was limited to the engraving of glass cameos. Really, then, glass-cutting is strictly a modern art, one made possible by developments in other lines.

The art of choosing wisely and combining judiciously the various ingredients that enter into the composition of our best glass is, from the standpoint of the glass-cutter, no less a comparatively recent attainment. One commonly thinks of glass simply as a colorless, transparent substance, which in a molten state lends itself readily to manipulative purposes. Between the common, cheap glass of commerce and the material required by the glass-cutter for producing his best effects there is all the difference in the world, and the efforts of the best engravers would be abortive if the supremest care were not taken in the composition of the material.

The bases used in the manufacture of glass, as is commonly known, are soda, potash, lime, alumina, and oxide of lead, and the relative proportions of these ingredients and the way in which they are treated determine the quality of the material. If the manufacturer wishes to make his glass more fusible, he adds potash and soda; if less fusible, he adds alumina. If he wishes to make his material harder, he resorts to a more liberal use of lime. To heighten refractory powers or increase luster, he uses a generous solution of lead. The importance, therefore, of a full knowledge of the relative percentages of the different ingredients can readily be seen, and hence it would scarcely be an exaggeration to say that the man who prepares the material must, in a sense, be as much of an artist as the man who cuts the finished piece.

"In making bottles, the cheapest glass," said a prominent manufacturer recently, in explanation of the methods commonly followed, "lime is added to the potash, or soda and silicate. The medicine-bottle, a better glass, has more potash. Window-glass contains both potash

and soda ; the finer kinds of glass made without lead are called crown glass. But where glass of the finest quality for cutting and polishing is desired, oxide of lead must be used, and in general, a better grade of sand and alkali. This is often called flint-glass, as distinguished

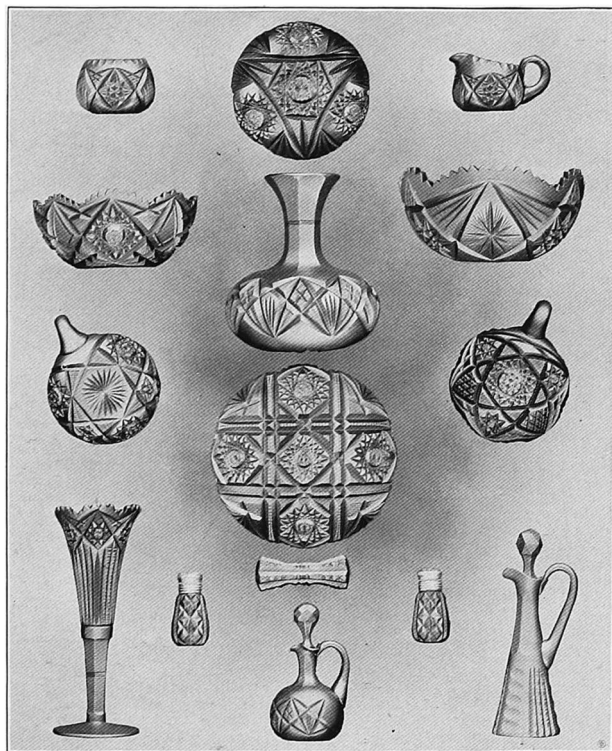


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from the cheaper or lime-glass. The flint-glass is heavier as well as more brilliant. The lime-glass has a decidedly greenish tint. Lead or flint glass may also be recognized by the clear tone it gives forth when struck, as a bell. If color is desired in flint-glass, certain metallic oxides are used with the usual ingredients. The addition of oxide of copper gives a blue color, while oxide of iron imparts a yellow. Pure gold yields a ruby-red."

These facts may seem encyclopedic, but they are important for an

understanding of the means used and the care needed in the preparation of the material used by the American glass-cutters. A wrong selection of ingredients, or an excess of one ingredient over another, would be fatal for the result desired. Hence all ingredients must be

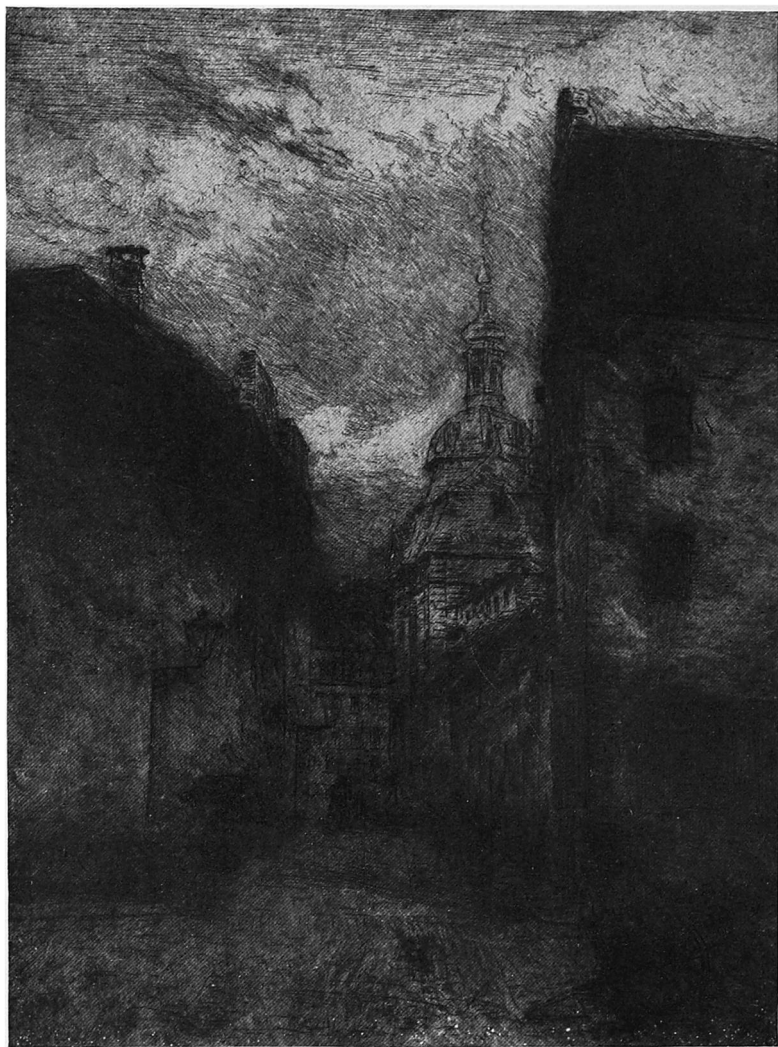


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selected with the greatest care, weighed with extreme accuracy, and thoroughly mixed.

This mixture constitutes the "batch," as it is called, and it will be of interest to the reader to follow it through its various stages until it appears, through the manipulations of the workmen, luminous with brilliancy and glinting with prismatic color.

The clay-pot or crucible must be in perfect condition for the reception of the mixed ingredients. First the batch is gradually brought to melting-point, which is approximately 2,500 degrees



OLD STREET IN DÜSSELDORF
By Erich Nikutowski
From an Etching



Fahrenheit. It is then allowed to cool slowly until it is of the proper consistency to "gather." This consists in a workman inserting into the mass the end of an iron blowing-pipe to which a quantity of the molten glass adheres. The pipe is passed to a second workman, who gives some semblance of form to the piece by blowing, and then passes it on to the "gaffer," or foreman, who puts the piece into its final shape.

The article is now too brittle to be of service, and must be annealed. The articles, according to size, are placed in a kiln, or a "leer," or oven, every possible care being taken to guard against the slightest draught of air, since this would crack the glass. A hardwood fire is maintained under the pieces to be annealed for about a day, after which it is removed, and the doors of the kiln are sealed hermetically. In this air-tight compartment the larger pieces of glass remain for about a week. The temperature is reduced by natural radiation until the ware is cool enough for handling.

The ovens, or leers, used for annealing small pieces are about sixty feet long, with a fire-box that extends only about the first six feet. The ware is placed on pans hooked together and conveyed slowly from one end to another by an endless chain. This trip of about sixty feet requires twenty-four hours. Thus, according to the size and thickness of the glass, the time required for annealing is from one to seven days. Every piece as it comes from the oven is carefully examined by experts trained to detect the slightest flaw in the material. Perfect pieces are now ready for the cutter.

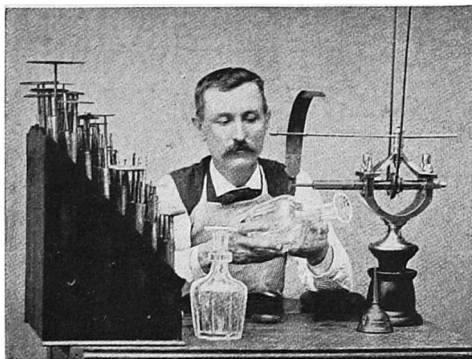
The "rougher" first makes a comparatively rude outline of the design on the surface of the glass with a reddish gummy fluid. The pattern is then "roughed" in with revolving discs kept moist with sand and water. These discs or iron wheels vary in size and thickness according to the necessities of the pattern, frequently a dozen or more discs being required for "roughing" in the pattern of the piece.

This step being finished, the ware passes into the hands of the foreman for his critical inspection, after which it goes to the "smoother," who smooths down the rough edges of the incised pattern with stone wheels, likewise kept moist with dripping water. Not infrequently certain portions of the pattern are cut directly by the "smoother" without "roughing."

The nicety required in this work can readily be understood. If the cutting discs get "out of true," the pattern will be irregular, and lack the perfect lines necessary for the finest effect. If the tiniest pebble finds its way in the sand to the surface of the disc it is likely to utterly ruin the article in a second. Patterns require cutting from a hair-line on tiny articles to incisions of considerable depth in larger and more costly pieces. The inexperienced would scarcely realize the nicety of touch required on the part of the cutter. He must know instinctively how deeply his wheel is penetrating into the material, and when

to remove the glass from the cutting apparatus. A slight excess of pressure would overheat and fracture the glass, and thus ruin a costly article, when practically all the pattern had been incised upon it.

From the "smoother" the ware goes to the "polisher." First wooden wheels fed with a mixture of pumice, rotten stone, and water are used, and then brush wheels moistened with the same preparation. Next the articles are brushed with putty powder, a preparation of tin and lead, and finally they are polished with wooden or cork wheels moistened with putty powder, or with thick felt wheels.



AN ENGRAVER AT WORK

This brief outline will give the reader some idea of the various stages through which a single article of cut glassware has to pass in evolving from a formless mass of ingredients into a thing of beauty and utility. It will be seen that there is not a step in the process at which the slightest mistake or slip would not prove fatal to the finished result. Designs for the most part are of geo-

metric pattern, since these lend themselves most readily to the use of the wheel. Lapidary cutting, commonly seen on stoppers for bottles, and engraving upon glass are simply variations of the process already described, the difference being not one of methods and means so much as of pattern.

In the latter more latitude is allowed to the engraver, who cuts away the material in a sort of free-hand manner, so as to produce figures, flowers, and so forth. In engraving, the workman uses copper wheels, which vary in size from the diameter of a pin's head up to six inches or more. Some of these wheels are as thin as a hair, while others are a quarter of an inch thick. These are attached to the end of a steel rod which is fastened to a lathe, the revolving discs being moistened from time to time with drops of oil and emery powder. The engraver is thus in a sense an artist, and not a mere copyist, and within the limited scope permitted by his tools and his material has an artist's liberty to work something of his own individuality into his patterns.

The two accompanying illustrations showing workmen at their wheels, the larger a "rougher" and the smaller an "engraver," will

perhaps convey a better impression of the glass-cutter's peculiar work than a verbal description of the methods followed.

Those at all familiar with cut glass know there is a vast difference in the quality of the ware placed upon the market. The most highly prized articles transmit light as colorless as a crystal. Inferior articles



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show a distinct tint, giving a yellowish, greenish, or smoky effect. These variations are a matter for which the mixer of the ingredients is responsible, and he is the best workman who can so apportion and mix his materials as to approximate most closely to the perfect crystal. Again, in the better class of ware the patterns are more carefully executed, the lines are perfect in their symmetry, the incisions are sharp and clear cut, and the polishing is done with perfect evenness.

In inferior work, on the other hand, the patterns betray irregularities that militate against the effect of the piece as a whole, there are breaks in the fluent lines, and flaws in the polished surfaces. Hence there are few lines of art work requiring greater precision and deftness from start to finish on the part of the workmen than cut glass.

It is not contended here that Americans have succeeded in producing clearer and more perfect material than Europeans, but it is contended that within the last decade or two we have educated a large body of workmen who are second to none in the world in this peculiar, painstaking art industry. It is further contended that in point of artistic patterns our designers have been more successful than those who have produced the stock patterns of the Old World product. It may safely be said that Europe has produced prize pieces that have never been excelled. But these individual pieces can scarcely be taken as the standard by which to assign rank to the respective industries of the two continents. The average of excellence in the gross output, taking into consideration clearness and texture of material, perfectness of cutting and polishing, and charm of design, should more properly be taken as the standard. From the standpoint of this average excellence American workers in cut glass are now in position to become teachers of the European workers, their former mentors.

EDWARD L. PRENTISS.



RECENT WORK OF ILLUSTRATORS— ARTHUR J. KELLER

The four accompanying illustrations, reproduced by courtesy of D. Appleton & Co. from Frank R. Stockton's entertaining novel, "Kate Bonnet," are thoroughly characteristic of Arthur J. Keller's latest and best work. Keller has been eminently successful in his chosen line of art, having received early recognition, and having been employed continuously by the leading magazines and also by various publishers of books. He was born in 1866 in New York, receiving his first encouragement and tuition in art from his father. After a short apprenticeship with a lithographer in New York, he was sent to the Academy of Design, and while there was awarded the Suydam medal for life drawing and the Halgarten prize for composition. After three years at the Academy he went to Munich, where he studied for two years under Professor Loefftz. His first painting of note, "An Old Woman and Young Girl in Church," was purchased by the Munich Academy. Of his other paintings, "Lead, Kindly Light," won him a gold medal at Philadelphia in 1899, and "The Finishing Touches" won the William T. Evans prize in 1902. As